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A case report describing diverticulosis of the appendix presenting as acute appendicitis

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ABSTRACT

INTRODUCTION: Diverticulosis of the appendix (DA) is a rare clinical finding which is often confused with acute or chronic appendicitis and is usually only identified during or after appendectomy. The symptoms of DA can last for up to two weeks and laboratory studies tend to reflect a more chronic inflammation. Distinguishing the two entities is important as DA has a higher risk for perforation and may be associated with an underlying malignancy.

PRESENTATION OF CASE: A 54--year old African--American male presented with three--days of right sided abdominal pain, nausea, and vomiting. Physical exam and abdominal CT imaging were concerning for early acute appendicitis. The patient was taken emergently to the operating room for laparoscopic appendectomy. Extensive adhesions were found around the Appendix which was grossly abnormal with multiple diverticula. The patient had an uneventful recovery.

DISCUSSION: Patients with DA are often misdiagnosed with chronic or acute appendicitis based on their presenting symptoms and imaging. While appendectomy is the definitive treatment, diagnosing DA before surgery is important in determining the patient's risks and potential complications.

CONCLUSION: Diverticulosis of the Appendix is a rare clinical entity which is often misdiagnosed. Better imaging techniques and higher indices of clinical suspicion are needed to make the appropriate diagnoses before patients are taken for surgery.

1. Introduction

Diverticulosis of the appendix (DA) is a rare anatomical variant found in 0.004% to 2.1% of appendectomies [1]. Although DA was first described in 1893, it remains a little studied and poorly understood clinical entity [6]. Its symptoms are similar to and often mistaken for those of early acute or chronic appendicitis [8,10]. While appendectomy is curative for both, it is important to distinguish DA from appendicitis as it is four times more likely to perforate and may be a sign of an underlying neoplasm [2]. Abdominal CT and sonography may aid in diagnosis, but their utility is highly technician and radiologist dependent [7]. Given these factors, DA remains a largely incidental finding without a clear diagnostic algorithm.

2. Presentation of case

A 54--year old African--American male with a history of COPD and hypertension presented to the Emergency Department with a three--day history of right sided abdominal pain, nausea, and vomiting. He had similar symptoms one week prior and was sent home from the Emergency Department after a CT scan revealed a normal appendix. His past medical history was significant for hypertension and chronic obstructive pulmonary disease. He had no previous surgeries.

Examination revealed diffuse abdominal tenderness to palpation across all quadrants without rebound or guarding. All laboratory studies were within normal limits including a white blood cell count of 7300 g/dL. An abdominal CT scan revealed a mildly dilated fluid--filled Appendix with mild wall thickening and enhancement and minimal adjacent inflammation, which was concerning for early acute appendicitis.

The patient was taken emergently to the operating room for laparoscopic appendectomy performed by the attending surgeon with the assistance of a senior resident physician and two students. During the procedure, extensive adhesions were found around the Appendix suggestive of chronic appendiceal inflammation. The adhesions were lysed and the Appendix identified and removed

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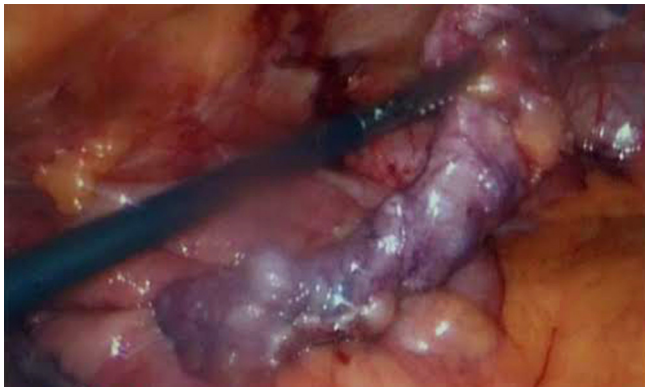

Fig. 1. Laparoscopic resection of the appendix.

Fig. 2. Multiple diverticula of appendix.

(Fig. 1). The Appendix was noted to be grossly abnormal with multiple diverticula (Fig. 2). No other gross pathology was noted and the abdomen was closed. The patient had an uneventful recovery.

Pathology of the removed Appendix revealed budding--like lesions protruding from the appendiceal wall suggestive of focal diverticular protrusion with fibrous obliteration. There was focal serositis without inflammation of the appendiceal mucosa or wall.

3. Discussion

Appendiceal diverticula are either congenital or acquired [10]. Congenital diverticula are outpouchings of the entire appendiceal wall and account for 3% of all diagnosed cases of diverticulosis of the appendix (DA)[1,7,8]. Acquired, or pseudodiverticula, account for the remaining majority of cases. These arise from the herniation of the appendiceal mucosa and submucosa through defects in the muscularis near penetrating arteries [7]. They are believed to arise from sustained contraction of the Appendix behind an obstruction leading to luminal distension, inflammation, and perforation [2,3,7]. Sources of obstruction may include, but are not limited to inflammation, fecaliths, calculi, and neoplasms [3,4].

DA as described in the case above is often misdiagnosed as acute appendicitis [3]. Features that should raise the clinical suspicion for DA include a prolonged course – up to two weeks – of right--sided lower abdominal pain which may be preceded by a chronic history of multiple previous pain episodes [10]. Laboratory studies tend to support a history of chronic inflammation with comparatively lower white blood cell counts and higher CRP levels [3,5,9]. Furthermore, patients presenting with DA are often older than 30 years which is outside of the typical age range for appendicitis [1]. Men are more commonly affected than women [1,3]. While both abdominal CT and US have been shown to aid in the differentiation of DA and acute appendicitis, their utility is highly technician--dependent and limited by a generally low index of suspicion for DA [3]. The definitive treatment for both conditions is appendectomy [2,10].

Further complicating the differentiation of DA and acute appendicitis are the various cases in which appendiceal diverticula may present with either a normal--appearing or inflamed appendix. Each of the four possible clinical scenarios has been classified based on the appearance of the Appendix and the diverticula [7]. Class 1 features a non--inflamed Appendix with diverticulitis;- Class 2, both appendicitis and diverticulitis;- Class 3, appendicitis with a non--inflamed diverticulum;- and finally, Class 4, a non--inflamed Appendix with a non--inflamed diverticulum [2,7].

Although this and previous reports have outlined the clinical features that distinguish DA from acute appendicitis, early diagnosis of DA remains challenging. Diagnosing DA before surgery is important in determining the patient's risk of appendiceal perforation, post--operative complications such as abscess, and the potential for a neoplastic cause of the initial obstruction [2,3,10]. At this time, diagnosis should be guided by symptomatology and laboratory findings with confirmation after prompt appendectomy. Further work is needed to improve our ability to radiologically confirm suspected cases of DA.

4. Conclusion

We presented a case in which a patient with DA was misdiagnosed with early acute appendicitis. This case provides an example of the symptomatology, inconsistent radiographical findings, and atypical patient demographics that should raise the suspicion for DA. Although the definitive treatment for both DA and acute appendicitis is appendectomy, they each have unique risks and complications which make preoperative diagnosis a valuable step in the patient's hospital course. Improving our ability to identify DA before surgery will require higher indices of clinical suspicion based on patient presentation and better radiographic differentiation of the two clinical entities.

Conflict of interest

None of the authors report a conflict of interest in this case report.

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Ethical approval

All identifying information has been removed from the case.

Consent

No identifying information has been given, official consent has not been obtained as the patient has been lost to follow up.

SCARE guidelines

This work was reported in line with the SCARE criteria and the corresponding checklist was completed by the authors. (R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill and S.C.A.R.E. for the Group, The SCARE statement: concensus-based surgical case report guidelines, *Int. J. Surg.* 2016.)

Author contributions

Sarah L Khan performed data collection, analysis, and writing. Madhu Siddeswerappa and M. Farrukh Khan did analysis and writing.

Registration of research studies

N/A.

Guarantor

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